

# Effects of Public Policy on Adolescents' Cigar Use: Evidence From the National Youth Tobacco Survey

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To determine the effect of prices and regulations on youth cigar demand, we estimated logistic regression models of the probability of current cigar smoking among students in grades 6 to 12 with data from the 1999 and 2000 waves of the National Youth Tobacco Survey. We found that youth cigar demand is sensitive to price but not state tobacco-control regulations. The results suggested that raising excise taxes on cigars could reduce cigar use prevalence among youths. (*Am J Public Health*. 2005;95:995–998. doi: 10.2105/AJPH.2003.030411)

Reducing tobacco use among youths is an important public policy goal. In working toward this goal, policymakers typically have focused on cigarettes rather than the full range of tobacco products. For example, the surgeon general's 1994 report, *Preventing Tobacco Use Among Young People*,<sup>1</sup> does not even list cigars in the report's index. The focus on cigarettes

is understandable given that they are the most common tobacco product used by youths.<sup>2,3</sup> However, the prevalence rates for use of tobacco products other than cigarettes are not trivial, particularly for cigars. Recent estimates indicate that 15% of high-school students and 7% of middle-school students report current cigar use.<sup>3</sup> Moreover, the use of cigars can lead to devastating health effects, similar to those associated with cigarette smoking.<sup>4,5</sup> (Regular cigar use causes cancer of the lung, oral cavity, larynx, and esophagus.<sup>5</sup> Moreover, heavy cigar smokers and those who inhale deeply face elevated risks of coronary heart disease and chronic obstructive pulmonary disease.<sup>5</sup>)

Much like policymakers, researchers have focused their efforts on understanding cigarette demand among youths. Although an extensive literature is available concerning the effect of public policies on youth cigarette smoking behavior (for a summary of this literature, please see Jacobson et al. 2001<sup>6</sup>), very little research has examined the determinants of youth cigar demand. In fact, to our knowledge, this brief is the first to estimate the effects of tobacco prices and regulations on the prevalence of cigar use among adolescents.

## METHODS

### Data

The primary data for this analysis were the 1999 and 2000 waves of the National Youth Tobacco Survey. The National Youth Tobacco Survey was designed to provide nationally representative data on tobacco-related issues for a sample of students in grades 6 to 12. (For a detailed description of the sample design of the National Youth Tobacco Survey, please see ORC Macro<sup>7,8</sup> or Centers for Disease Control and Prevention.<sup>9</sup>) We supplemented the National Youth Tobacco Survey with market-level grocery store scanner price information on cigars (dollar per cigar) and smokeless tobacco (dollar per ounce) from the marketing firm ACNielsen. Data on cigarette prices were state-level average prices published in *The Tax Burden on Tobacco*.<sup>10</sup> We also merged in state-level tobacco control policies and activities from the Centers for Disease Control and Prevention's State Tobacco Activities Tracking and Evaluation (STATE) System.<sup>11</sup> In addition, we con-

**TABLE 1—Descriptive Statistics for the Analysis Sample of Students in Grades 6 to 12: Data From 1999 and 2000 National Youth Tobacco Survey**

	Full Sample	Means, %	
		Males	Females
Age, y			
9-11	8.2	7.5	8.9
12-14	48.6	48.0	49.2
15-17	43.2	44.6	41.9
Race/ethnicity			
White	64.7	65.4	64.0
African American	17.6	16.7	18.5
Hispanic	11.7	11.5	11.9
Other	6.0	6.4	5.5
Female	50.1	NA	NA
Current use of cigars	9.5	13.5	5.5
Price of tobacco products, \$ <sup>a</sup>			
Cigars, per cigar	0.72	0.72	0.72
Cigarettes, per pack	2.25	2.26	2.25
Smokeless tobacco, per ounce	1.87	1.88	1.86
State tobacco control policies			
Purchase law	58.3	58.2	58.4
Possession or use law	58.6	57.8	59.5
Clean indoor air law	54.4	54.1	54.7
State-sponsored media campaign	23.1	23.0	23.2
No. of observations	33 632	16 801	16 831

Note. NA = coefficient not applicable for that subsample.

<sup>a</sup>Amounts given are actual, not mean, values.

structed a variable indicating whether a state had launched a significant antitobacco media campaign.

To examine the effect of prices and regulations, we estimated logistic regression models of the probability of current cigar use. (*Current cigar use* was defined as having used cigars during the past 30 days.) All estimates were weighted and standard errors were adjusted to account for the complex survey design. Descriptive analyses indicated that the pattern of cigar use varied dramatically by gender,<sup>2,3</sup> so we estimated models for the full sample and for each gender.

For ease of interpretation, we presented the marginal effects from the model, which were calculated at the mean values for all variables, and measured the change in the probability of cigar smoking attributable to a one-unit change in the explanatory variable of interest. In addition, we calculated the participation price elasticity of demand for cigars. The

elasticity was calculated as the percentage change in cigar smoking participation resulting from a 1% change in the price of cigars.

## RESULTS

Almost 14% of the males and 6% of the females reported current cigar use (Table 1). Additionally, the average price per cigar was \$0.72, and most of the respondents lived in states with youth access and clean indoor air laws. The state-sponsored media campaigns were not very prevalent.

The logistic regression results, presented in Table 2, showed that an increase in the price of cigars was associated with a reduction in cigar use in the full sample and males-only model. The elasticity estimate implied that a 10% increase in price would reduce cigar use prevalence in the full sample by 3.4%.

The cross-sectional nature of our analysis limited our ability to make causal inferences.

**TABLE 2—Logistic Regression Models of the Probability of Current Cigar Use in Students in Grades 6 to 12: Data From 1999 and 2000 National Youth Tobacco Survey**

	Full Sample	Males	Females
Price of tobacco products			
Cigars, per cigar	-0.042 (-2.57)*	-0.063 (-2.32)*	-0.020 (-1.65)
Cigarettes, per pack	-0.028 (-1.71)	-0.031 (-1.49)	-0.026 (-1.66)
Smokeless tobacco, per ounce	0.006 (0.83)	0.009 (0.91)	0.003 (0.52)
Age, y			
9-11	Reference	Reference	Reference
12-14	0.073 (6.46)*	0.117 (5.28)*	0.036 (3.75)*
15-17	0.157 (9.97)*	0.250 (9.07)*	0.075 (5.74)*
Race/ethnicity			
White	Reference	Reference	Reference
African American	0.007 (1.09)	-0.006 (-0.69)	0.020 (3.19)*
Hispanic	0.002 (0.29)	-0.004 (-0.46)	0.008 (1.26)
Other	-0.012 (-1.68)	-0.020 (-1.97)*	-0.005 (-0.50)
Gender			
Male	Reference	NA	NA
Female	-0.074 (-17.01)*	NA	NA
Period			
2000 wave	Reference	Reference	Reference
1999 wave	0.005 (0.81)	-0.003 (-0.35)	0.015 (2.36)*
State tobacco control policies			
Purchase law	0.019 (2.30)*	0.018 (1.62)	0.020 (2.78)*
Possession or use law	-0.005 (-0.66)	-0.001 (-0.08)	-0.009 (-1.25)
Clean indoor air law	-0.002 (-0.33)	-0.002 (-0.17)	-0.004 (-0.67)
State-sponsored media campaign	0.000 (0.02)	-0.009 (-0.58)	0.009 (1.09)
No. of observations	33 632	16 801	16 831
Own price participation elasticity	-0.336	-0.349	-0.240

Note. NA = coefficient not applicable for that subsample. Marginal effects are reported with z statistics in parentheses. \* $P < .05$ .

Omitted variables that affect both cigar prices and cigar use among youths (e.g., state sentiment toward smoking) may have generated a spurious correlation. The problem of reverse causality (i.e., cigar use driving changes in cigar prices), however, was not a problem in this case because economic theory would indicate a relation in the opposite direction from what we found (i.e., a positive relation between cigar use and cigar prices).

With the exception of purchase laws, state-level tobacco-control policies do not have a statistically significant effect on cigar use. The finding that youths living in states with purchase laws were more likely to smoke cigars than were youths living in other states is somewhat counterintuitive and may be associated with unobserved state-level characteristics.

## DISCUSSION

The preceding analysis addressed the effects of policy on youth cigar demand, a neglected area of inquiry on the part of health policy researchers. More important, our results suggested that policymakers have a significant opportunity to reduce the prevalence of youth cigar smoking by raising federal and state excise taxes. Currently, cigars are taxed at a lower rate than are cigarettes, even though they produce similar, devastating health effects.<sup>12</sup> In fact, the federal excise tax rate for cigarettes is about 3.5 times higher than it is for cigars. When we used the elasticity estimate of  $-0.34$  for the full sample, we calculated that approximately a 5% reduction in the prevalence rate of youth cigar use

could be realized if policymakers at the state and federal levels simply taxed cigars at the same rate as cigarettes. ■

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## Contributors

J.S. Ringel and J. Wasserman originated the study and formulated the empirical strategy. J.S. Ringel supervised the empirical analyses and led the writing of the brief. J. Wasserman assisted with the writing of the brief and with the analyses. T. Andreyeva performed the empirical analyses. All authors helped to interpret results and review drafts of the brief.

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## Human Participant Protection

No protocol approval was needed for this study.

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